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Controlling Wildlife Vectors of Bovine Tuberculosis

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National Wildlife Research Center Scientists Examine Risks of Bovine Tuberculosis Transmission from Wildlife to Domestic Animals

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research organization devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and acceptable methods, tools, and techniques.

Increased urbanization, greater acceptance and desire of living closer to free-ranging wildlife, and increasing wildlife numbers have led to increased conflicts between people and wildlife. Such conflicts can take many forms, both direct and indirect. Recently, the potential for the transmission of diseases among wildlife, livestock, and humans has received greater attention.

Tuberculosis (TB) is a contagious, bacterial disease of both animals and humans. Bovine TB can be transmitted from livestock to humans and to other animals. The significance of the disease is reflected in APHIS' efforts to eradicate TB from the United States. The eradication program, which began in 1917, has made significant progress over the years. By the mid-1990's, only a few known infected cattle herds remained, suggesting that the eradication of the disease in the United States was forthcoming. However, Michigan, as well as a few other states, remains infected. Between 1975 and 1998, bovine TB was documented in Michigan's white-tailed deer with increasing prevalence, and scientific evidence revealed that infected deer transmitted the disease to some of Michigan's cattle. Consequently, Michigan's Accredited-Free Status, which allows for unrestricted interstate movement of cattle, was suspended by APHIS on August 13, 1998.

In 2000, the United States Secretary of Agriculture enacted a Declaration of Emergency for bovine TB, citing threats to livestock, and public health and safety. In 2001, NWRC initiated research that could assist in reducing or eliminating the transmission of this disease to cattle and humans.

Major Research Accomplishments:

- WS evaluated techniques, such as fencing, guard dogs, and scare devices, for decreasing interactions between deer and cattle in Michigan.
- WS determined that coyotes are an acceptable sentinel species for monitoring the prevalence and spread of TB.
- WS studied how small mammals interact with cattle and use cattle farms, in order to reduce the spread of TB from wildlife to cattle.
- WS is conducting field and laboratory studies to determine if raccoons and coyotes shed the bacterium responsible for causing bovine tuberculosis.
- WS is studying deer use of cattle farms and nearby habitats in order to prevent deer from transmitting bovine tuberculosis to cattle.
- WS used infrared technology to detect TB infection in deer and to remotely read comparative cervical skin TB (CCT) tests in cattle and deer.

Applying Science and Expertise to Wildlife Challenges

A Frightening Device for Deterring Deer Use of Cattle Feed—In Michigan, wild white-tailed deer continue to be a reservoir for reinfecting cattle herds with bovine TB. Following intensive studies of deer activity, NWRC scientist determained that direct interaction between deer and cattle is rare, although deer with tuberculosis may contaminate cattle feed and indirectly infect cattle.

NWRC researchers designed and evaluated a new frightening device for deterring deer from cattle feeders. The deer-resistant cattle feeder (DRCF) specifically attempted to condition deer to avoid cattle feeders through delivery of negative physical stimuli. In field studies, the DRCF was ≥ 99 percent effective at deterring deer. Results suggest that DRCFs can effectively limit deer use of cattle feed, potentially with minimal impact on feeding behavior of cattle, thus reducing potential transmission of bovine TB through contaminated feed.

Evaluating the Role of Wildlife in Bovine TB Transmission—Bovine TB infections in Michigan have been primarily in white-tailed deer and cattle. However, other wildlife species have been found to

harbor the disease, specifically raccoons and coyotes. In the infected areas of Michigan, prevalence of infection with bovine TB is approximately 30% in coyotes and 2-4% in raccoons. Ongoing NWRC research seeks to identify whether coyotes and raccoons are involved in the transmission of bovine TB to cattle and other wildlife.

Groups Affected By These Problems:

- U.S. citizens
- Wildlife and natural resource managers
- Livestock producers and farmers
- Sporting organizations
- Consumers
- Meat processors
- State health departments

Major Cooperators:

- Michigan Department of Agriculture
- Michigan Department of Natural Resources
- Michigan State University
- Michigan State Department of Public Health
- USDA Veterinary Services
- WS Operations personnel

Selected Presentations:

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